

## CLAIMS

1. A gas turbine engine provided with a foreign matter removal passage,  
comprising:

5 an outer casing;

an inner casing received in the outer casing so as to define a bypass duct  
having an annular cross section in cooperation with the outer casing;

an outer liner received in the inner casing;

10 an inner liner received in the outer liner so as to define an intake passage in  
cooperation with the outer liner;

a first compressor provided in a downstream end of the intake passage;

a combustor connected to an outlet end of the first compressor;

a turbine provided adjacent to an outlet end of the combustor;

15 a rotary shaft rotatably received in the inner liner and having a front fan  
attached to a front end thereof adjacent to both an inlet end of the bypass duct and an  
inlet portion of the intake passage, the rotary shaft further carrying a impeller wheel  
of the first compressor and a turbine wheel of the turbine at appropriate parts thereof;  
and

20 a foreign matter removal passage communicating with the intake passage  
via a plurality of foreign matter introduction openings formed in the inner casing and  
with the bypass duct via a plurality of foreign matter ejection openings formed in the  
outer liner.

2. The gas turbine engine according to claim 1, wherein the intake passage  
25 further comprises a curved portion connected to a downstream end of the inlet

portion and directed more toward an axial line of the rotary shaft than the inlet portion and a reduced diameter portion connected to a downstream end of the curved portion and defining a part of the intake passage having a smallest diameter with respect to the central axial line, and the foreign matter introduction openings that  
5 communicate the intake passage with the foreign matter removal passage are formed at least in a part of the outer liner corresponding to the reduced diameter portion.

3. The gas turbine engine according to claim 1, wherein the intake passage further comprises a curved portion connected to a downstream end of the inlet  
10 portion and directed more toward an axial line of the rotary shaft than the inlet portion and a reduced diameter portion connected to a downstream end of the curved portion and defining a part of the intake passage having a smallest diameter with respect to the central axial line, and the foreign matter introduction openings that communicate the intake passage with the foreign matter removal passage are formed  
15 at least in a part of the outer liner corresponding to the curved portion.

4. The gas turbine engine according to claim 1, wherein the foreign matter removal passage is defined between the inner casing and outer liner at least in a region adjacent to the curved portion of the intake passage.  
20

5. The gas turbine engine according to claim 1, wherein the foreign matter removal passage is defined between the inner casing and outer liner at least in a region adjacent to the reduced diameter portion of the intake passage.

25 6. The gas turbine engine according to claim 1, wherein the first compressor

comprises a centrifugal compressor.

7. The gas turbine engine according to claim 6, wherein an upstream end of the intake passage is provided with a second compressor comprising an axial flow  
5 compressor.

8. The gas turbine engine according to claim 1, wherein the foreign matter introduction openings are formed in the outer liner in a circumferential arrangement.

10 9. The gas turbine engine according to claim 1, wherein the foreign matter introduction openings are each provided with an elongated configuration selected from a group consisting of a slot, an elliptic hole and a rectangular hole.

10. The gas turbine engine according to claim 9, wherein each foreign matter  
15 introduction opening provided with an elongated configuration has a lengthwise axis slanted with respect to the central axial line.

11. The gas turbine engine according to claim 1, wherein the foreign matter ejection holes are formed in the inner casing in a circumferential arrangement.  
20

12. The gas turbine engine according to claim 1, wherein the foreign matter ejection holes are formed in a part of the inner casing recessed from a general wall surface of the inner casing facing the bypass duct.

25 13. The gas turbine engine according to claim 12, wherein the recess part is

covered by a lid plate which defines an opening in a rear edge thereof.

14. The gas turbine engine according to claim 1, wherein a part of the bypass duct corresponding to the curved portion of the intake passage curves radially outward.